

WHAT IS CLAIMED IS:

- 1 1. An image processing method, performed by an image supply device
- 2 storing image data and an image output device performing image processing
- 3 with respect to the image data, which are connected via a communication path
- 4 through which the image data is communicated, the method comprising steps
- 5 of:
  - 6 generating a control information item including a script for the image
  - 7 processing which is described by a markup language; and
  - 8 communicating the control information item between the image supply
  - 9 device and the image output device, the communicating step comprising:
    - 10 interpreting a control protocol for communicating the control
    - 11 information item, by a first entity which executes processing for a first
    - 12 hierarchic layer of a communication protocol;
    - 13 interpreting a management protocol for managing an image data
    - 14 file including the image data, by a second entity which executes processing for
    - 15 a second hierarchic layer of the communication protocol which is lower than
    - 16 the first hierarchic layer;
    - 17 controlling a physical layer of the communication path, by a third
    - 18 entity which executes processing for a third hierarchic layer of the
    - 19 communication protocol which is lower than the second hierarchic layer; and
    - 20 translating a command in the control information item between the
    - 21 control protocol and the management protocol.

1       2.       The image processing method as set forth in claim 1, wherein the  
2       management protocol is one of a picture transfer protocol (PTP) or a mass  
3       storage class of a universal serial bus (USB).

1       3.       The image processing method as set forth in claim 1, wherein the  
2       third entity controls a universal serial bus (USB).

1       4.       The image processing method as set forth in claim 3, wherein a still  
2       image capture device class is used for the USB.

1       5.       The image processing method as set forth in claim 1, wherein the  
2       second entity manages the image data file through use of a predetermined file  
3       system.

1       6.       The image processing method as set forth in claim 1, wherein the  
2       third entity controls one of a wireless local area network (LAN) and a peer to  
3       peer wireless data communication.

1       7.       An image processing system, comprising:  
2               an image supply device, operable to store image data; and  
3               an image output device, connected to the image supply device via a  
4               communication path through which the image data is communicated, and  
5               operable to perform image processing with respect to the image data,  
6               wherein each of the image supply device and the image output device  
7       comprises:

8                   a communication controller, operable to communicate, between the  
9   image supply device and the image output device, a control information item  
10   including a script for the image processing which is described by a markup  
11   language;

12                   a first entity, operable to execute processing for a first hierarchic  
13   layer of a communication protocol, and to interpret a control protocol for  
14   communicating the control information item;

15                   a second entity, operable to execute processing for a second  
16   hierarchic layer of the communication protocol of the communication protocol  
17   which is lower than the first hierarchic layer, and to interpret a management  
18   protocol for managing an image data file including the image data;

19                   a third entity, operable to execute processing for a third hierarchic  
20   layer of the communication protocol of the communication protocol which is  
21   lower than the second hierarchic layer, and to control a physical layer of the  
22   communication path; and

23                   a translator, which translates a command in the control information  
24   item between the control protocol and the management protocol.

1   8.           An image output device, connected to an image supply device storing  
2   image data via a communication path, the image output device comprising:

3                   a communication controller, operable to communicate, between the  
4   image supply device and the image output device, a control information item  
5   including a script for the image processing which is described by a markup  
6   language;

7                   a first entity, operable to execute processing for a first hierarchic layer

8 of a communication protocol, and to interpret a control protocol for  
9 communicating the control information item;

10 a second entity, operable to execute processing for a second  
11 hierarchic layer of the communication protocol of the communication protocol  
12 which is lower than the first hierarchic layer, and to interpret a management  
13 protocol for managing an image data file including the image data;

14 a third entity, operable to execute processing for a third hierarchic  
15 layer of the communication protocol of the communication protocol which is  
16 lower than the second hierarchic layer, and to control a physical layer of the  
17 communication path; and

18 a translator, which translates a command in the control information  
19 item between the control protocol and the management protocol.

1 9. A computer program product comprising a computer program which  
2 causes a computer to serve as the communication controller, the first entity,  
3 the second entity, the third entity, and the translator in the image output device  
4 as set forth in claim 8.

1 10. An image supply device, connected to an image output device  
2 performing image processing via a communication path, the image supply  
3 device comprising:

4 a storage, which stores image data to be subjected to the image  
5 processing;

6 a communication controller, operable to communicate, between the  
7 image supply device and the image output device, a control information item

8 including a script for the image processing which is described by a markup  
9 language;

10 a first entity, operable to execute processing for a first hierarchic layer  
11 of a communication protocol, and to interpret a control protocol for  
12 communicating the control information item;

13 a second entity, operable to execute processing for a second  
14 hierarchic layer of the communication protocol of the communication protocol  
15 which is lower than the first hierarchic layer, and to interpret a management  
16 protocol for managing an image data file including the image data;

17 a third entity, operable to execute processing for a third hierarchic  
18 layer of the communication protocol of the communication protocol which is  
19 lower than the second hierarchic layer, and to control a physical layer of the  
20 communication path; and

21 a translator, which translates a command in the control information  
22 item between the control protocol and the management protocol.

1 11. A computer program product comprising a computer program which  
2 causes a computer to serve as the communication controller, the first entity,  
3 the second entity, the third entity, and the translator in the image supply device  
4 as set forth in claim 8.

1 12. An image processing method, performed by an image supply device  
2 storing image data and an image output device performing image processing  
3 with respect to the image data which are connected via a communication path  
4 through which the image data is communicated, the method comprising steps

5 of:

6 generating a control information item including a script for the image  
7 processing which is described by a markup language; and

8 communicating the control information item between the image supply  
9 device and the image output device, the communicating step comprising:

10 interpreting a control protocol for communicating the control  
11 information item, by a first entity which executes processing for a first  
12 hierarchic layer of a communication protocol;

13 selecting one of second entities each executes processing for a  
14 second hierarchic layer of the communication protocol which is lower than the  
15 first hierarchic layer;

16 selecting one of third entities each executes processing for a third  
17 hierarchic layer of the communication protocol which is lower than the second  
18 hierarchic layer;

19 interpreting a management protocol for managing an image data  
20 file including the image data, by the selected one of the second entities;

21 controlling a physical layer of the communication path, by the  
22 selected one of the third entities; and

23 translating a command in the control information item between the  
24 control protocol and the management protocol.

1 13. The image processing method as set forth in claim 12, wherein the  
2 management protocol is one of a picture transfer protocol (PTP) or a mass  
3 storage class of a universal serial bus (USB).

1       14.     The image processing method as set forth in claim 12, wherein the  
2     selected one of the third entities controls a universal serial bus (USB).

1       15.     The image processing method as set forth in claim 14, wherein a still  
2     image capture device class is used for the USB.

1       16.     The image processing method as set forth in claim 12, wherein the  
2     selected one of the second entities manages the image data file through use of  
3     a predetermined file system.

1       17.     The image processing method as set forth in claim 12, wherein the  
2     selected one of the third entities controls one of a wireless local area network  
3     (LAN) and a peer to peer wireless data communication.

1       18.     The image processing method as set forth in claim 17, wherein the  
2     selected one of the second entities is valid in both of the image supply device  
3     and the image output device.

1       19.     The image processing method as set forth in claim 17, wherein the  
2     selecting step is performed in accordance with a state of the communication  
3     path.

1       20.     The image processing method as set forth in claim 19, wherein the  
2     selecting step is performed based on a priority table such that one of the  
3     second entities and one of the third entities having respectively a relatively

4 higher order in the priority table are selected prior to ones having a relatively  
5 lower order in the priority table.

1 21. An image processing system, comprising:  
2 an image supply device, operable to store image data; and  
3 an image output device, connected to the image supply device via a  
4 communication path through which the image data is communicated, and  
5 operable to perform image processing with respect to the image data,  
6 wherein each of the image supply device and the image output device  
7 comprises:

8 a communication controller, operable to communicate, between the  
9 image supply device and the image output device, a control information item  
10 including a script for the image processing which is described by a markup  
11 language;

12 a first entity, operable to execute processing for a first hierarchic  
13 layer of a communication protocol, and to interpret a control protocol for  
14 communicating the control information item;

15 a plurality of second entities, each operable to execute processing  
16 for a second hierarchic layer of the communication protocol of the  
17 communication protocol which is lower than the first hierarchic layer, and to  
18 interpret a management protocol for managing an image data file including the  
19 image data;

20 a plurality of third entities, each operable to execute processing for  
21 a third hierarchic layer of the communication protocol of the communication  
22 protocol which is lower than the second hierarchic layer, and to control a

23 physical layer of the communication path;  
24 a selector, which selects one of the second entities and a third  
25 entities; and  
26 a translator, which translates a command in the control information  
27 item between the control protocol and the management protocol interpreted by  
28 the selected one of the second entities.

1 22. An image output device, connected to an image supply device storing  
2 image data via a communication path, the image output device comprising:  
3 a communication controller, operable to communicate, between the  
4 image supply device and the image output device, a control information item  
5 including a script for the image processing which is described by a markup  
6 language;  
7 a first entity, operable to execute processing for a first hierarchic layer  
8 of a communication protocol, and to interpret a control protocol for  
9 communicating the control information item;  
10 a plurality of second entities, each operable to execute processing for  
11 a second hierarchic layer of the communication protocol of the communication  
12 protocol which is lower than the first hierarchic layer, and to interpret a  
13 management protocol for managing an image data file including the image  
14 data;  
15 a plurality of third entities, each operable to execute processing for a  
16 third hierarchic layer of the communication protocol of the communication  
17 protocol which is lower than the second hierarchic layer, and to control a  
18 physical layer of the communication path;

19                   a selector, which selects one of the second entities and a third  
20                   entities; and

21                   a translator, which translates a command in the control information  
22                   item between the control protocol interpreted by the first entity and the  
23                   management protocol interpreted by the selected one of the second entities.

1           23.    A computer program product comprising a computer program which  
2           causes a computer to serve as the communication controller, the first entity,  
3           the second entity, the third entity, the selector, and the translator in the image  
4           output device as set forth in claim 21.

5

1           24.    An image supply device, connected to an image output device  
2           performing image processing via a communication path, the image supply  
3           device comprising:

4                   a storage, which stores image data to be subjected to the image  
5                   processing;

6                   a communication controller, operable to communicate, between the  
7                   image supply device and the image output device, a control information item  
8                   including a script for the image processing which is described by a markup  
9                   language;

10                  a first entity, operable to execute processing for a first hierarchic layer  
11                  of a communication protocol, and to interpret a control protocol for  
12                  communicating the control information item;

13                  a plurality of second entities, each operable to execute processing for  
14                  a second hierarchic layer of the communication protocol of the communication

15 protocol which is lower than the first hierarchic layer, and to interpret a  
16 management protocol for managing an image data file including the image  
17 data;

18 a plurality of third entities, each operable to execute processing for a  
19 third hierarchic layer of the communication protocol of the communication  
20 protocol which is lower than the second hierarchic layer, and to control a  
21 physical layer of the communication path;

22 a selector, which selects one of the second entities and a third  
23 entities; and

24 a translator, which translates a command in the control information  
25 item between the control protocol interpreted by the first entity and the  
26 management protocol interpreted by the selected one of the second entities.

1 25. A computer program product comprising a computer program which  
2 causes a computer to serve as the communication controller, the first entity,  
3 the second entity, the third entity, and the translator in the image supply device  
4 as set forth in claim 24.